The Mining Journal

Established 1835

Railway & Commercial Gazette

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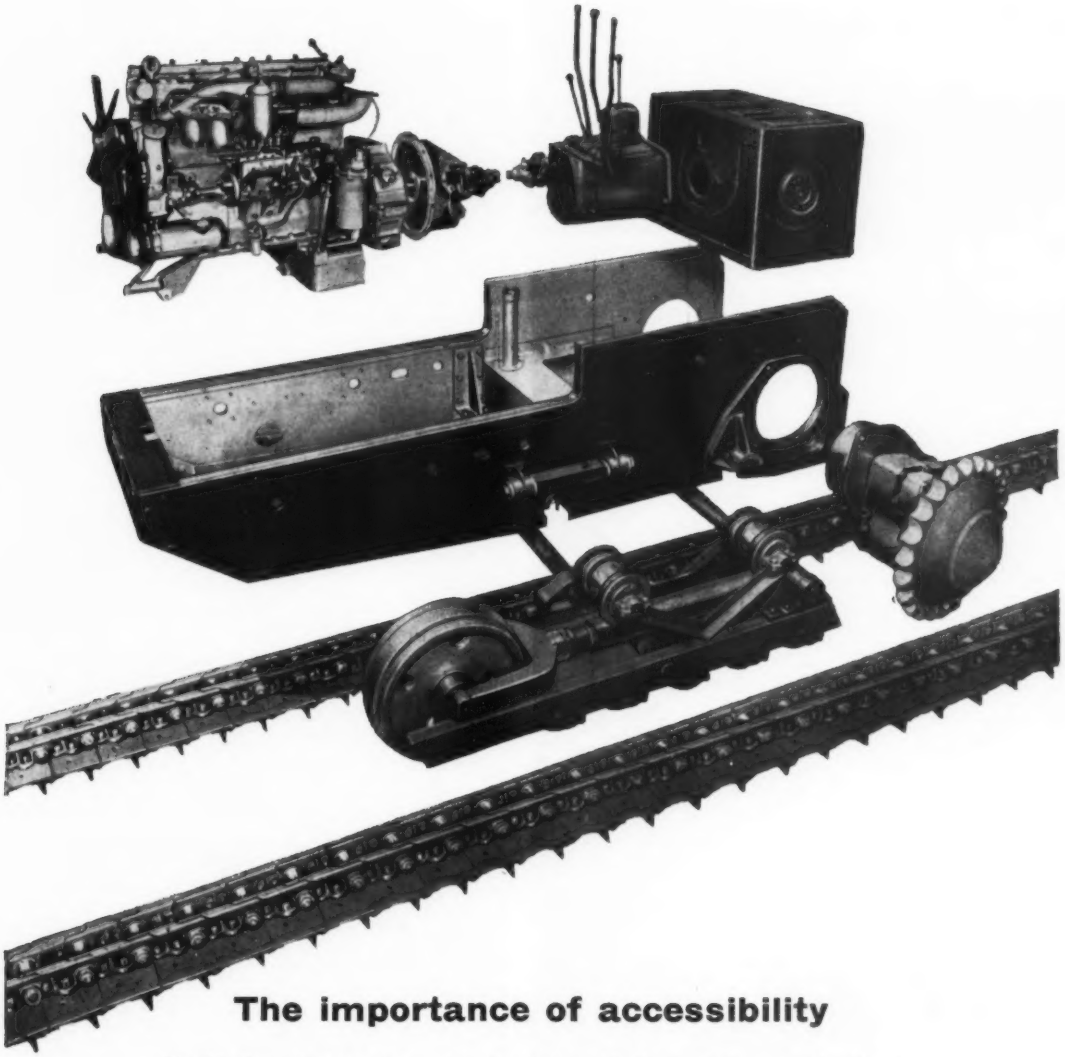

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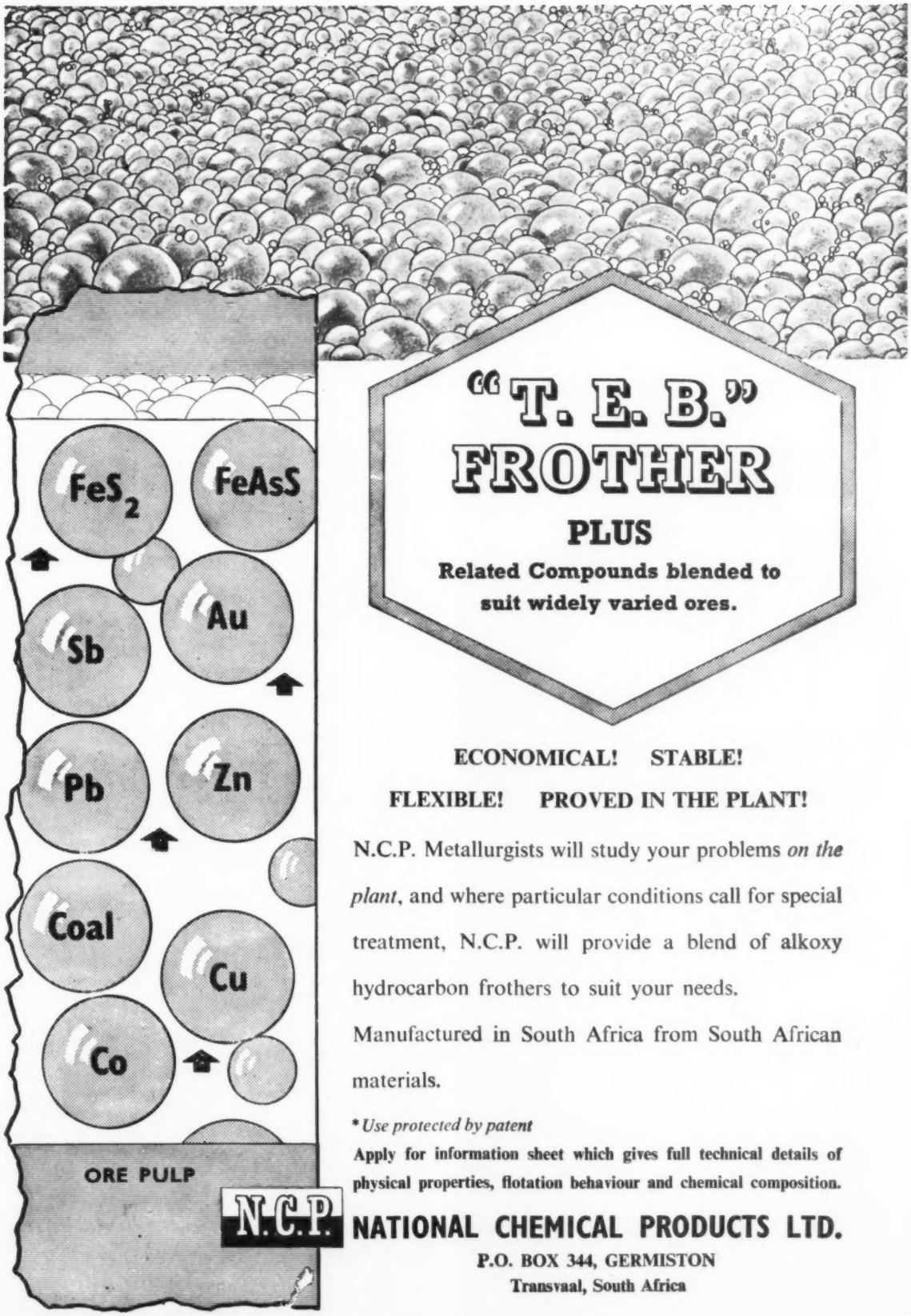

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NOTES AND COMMENTS

A Federation in Travail

Although the President of the African Mineworkers' Union, Mr. Katilungu, has appealed to African strikers to return to work and has had considerable success, the situation on the Copperbelt remains grave. A state of emergency persists (with a number of African leaders under arrest) and it may well last until the Commission of Inquiry has made its report on the causes of the recent unrest in the copper mines. The tragedy of the present troubles is that they have occurred at the outset of the African advancement programme, which was to inaugurate a new era in industrial racial relations, and indeed, in part, have grown out of it. The basic *industrial* cause of the unrest has been the compulsory transfer of certain grades of Africans from the African Mineworkers' Union to the African Staff Association. The refusal of Africans to wear leg-guards or to post discs on descending the mines is only a way of registering protest against these transfers and should not be understood as primary causes of unrest. Refusal is an act of defiance which does not involve a strike—and, more important, the paying out of union strike pay, for this does not exist—and yet helps to inflame racial feeling since these safety precautions are not required of Europeans. Racial feeling is particularly aroused by the leg-guards since the more imaginative can see in them a symbol of racial subjection—the European walks to work, the African crawls on his knees.

The dispute has two separate aspects; one narrowly juridical, the other sociological, political and constitutional. With the development of the advancement programme certain grades have been transferred to the African Staff Association and in fact Africans have been told that they cannot be considered for advancement unless they join the African Staff Association. The juridical dispute rests on whether the African Mineworkers' Union, in according recognition to the African Staff Association and to the jobs over which it should have recruiting rights, had given its prior consent to the transfer of these grades. The Chamber of Mines' view is explicitly that it had. The African Mineworkers' Union view is that it did not. Mr. Katilungu will admit his agreement to the transfer of jobs with a supervisory element but claims first that transfers are being required for jobs requiring technical, but not supervisory, skill, and secondly that the test of level of income rather than content of work is also being applied. The precise nature of a specific job is a matter on which even job evaluation experts can easily disagree and there may well be here—or so it seems from London—ground for reasonable and legitimate difference.

But if the A.M.U. case is given its most attractive face it is marred by two other arguments. The first is that the A.M.U. holds that recognition of the A.S.A. was forced out of it under threat by the Chamber of Mines to terminate bargaining agreements. Perhaps the Chamber of Mines could have carried through the establishment of the A.S.A. in other and better ways (and it is worth recalling that, given different historical circumstances, African advancement might conceivably have been agreed before—and possibly without—an A.S.A.). But that does not mean that the A.M.U.'s assent to the A.S.A. (whatever it may have covered) is not binding. All industrial bargains are the outcome of a clash of forces. The second argument is that the A.M.U. does not like the A.S.A. at all—whatever its recruiting area—because it has a no-strike clause in its constitution and is not therefore regarded by the A.M.U. as a *bona fide* trade union. Clearly the A.M.U. cannot argue on the nature of grades to be transferred and at the same time argue against the body for which the transfers are to be made.

But the dispute can be understood fully only in its setting. The A.M.U. is a broken reed and none know that better than its leaders. Mr. Katilungu is reported as flying to Kitwe to "save his union from destruction". For this there are many reasons but the most important is that few of its "members" pay their dues. At one time the companies collected union dues and paid them over but they refused to continue this policy when the union fee was raised from 6d. to 2s. 6d. per month. The companies were right. But it was the virtual end of the union. It is precisely because it had no funds for a strike that it called the series of minor stoppages and banned leg-guards and discs. If "advanced" Africans are all transferred the remains of the A.M.U. will be pitiful indeed. But though the union is broken administratively recent events have shown that it remains the rallying point of African opinion. This combination of administrative chaos and

emotional appeal is highly dangerous.

It has been the case of the companies that, while supporting the union in principle, they regard it as having fallen under unsuitable leadership. The steps the companies have taken have been forced by the absurdity of the union's actions. But the consequence of these steps has been to deprive the union of its income and, more recently, of its ablest members. If the companies have been wholly reasonable they have, in some respects, been somewhat negative in their attitude to the A.M.U. Should the present crisis be made the occasion of cleaning up the A.M.U., then the companies might consider giving more positive assistance toward building up a more efficient and stable organization. How can this be done? The A.M.U. clearly needs the advice of an able union administrator and the companies might perhaps consider meeting the expenses of a competent union official—acceptable to both the A.M.U. and to the companies—to act as an administrative consultant for a short period. There are other ways.

So far only the immediate causes of unrest have been touched upon. It is one of the misfortunes of the copper industry that it is inevitably buffeted by political forces from all sides. Many have blamed the recent troubles on the inflow of African Congress politicians to the A.M.U. But in the circumstances of an emergent nation the Africans, who are industrially active, are almost certain to be politically conscious. This is one of the central and durable facts of the present problem and has to be so recognized. Mr. Katilungu, it is true, has tried to keep the A.M.U. and the congress apart. But it has to be calculated how far Mr. Katilungu can keep African confidence if he carries this policy too far and secondly one has to guard against thinking that Mr. Katilungu is not wholly behind the A.M.U.'s dispute on transfers however much he may have disliked some of the recent actions of the agitators.

Just as unfortunate as the regrettable intrusion of African politics into the mining industry has been the intrusion of federal constitutional and political problems. Some of the most raucous calls for vigorous action against the A.M.U. have come from Southern Rhodesia. The Federal Government, too, has been naturally concerned, although labour is not a Federal matter, because the copper industry supplies the bulk of its income. Finally, the dispute has been caught up by the wave of annoyance in Salisbury that the Federation has been refused Dominion status and this annoyance will undoubtedly grow now that Ghana's imminent independence has been announced.

All of this means that the Chamber of Mines has not merely a very complex industrial problem on its hands. It has a problem heavily interlaced with political sociological and constitutional strands. One may well ask whether the present enquiry into the causes of unrest on the Copperbelt will suffice. Would it not be advisable to appoint a commission of inquiry to take a broader view of the social problems of the nascent federation?

Atomic Beryllium

Until recent years, the beryllium industry was dependent primarily on beryllium copper alloy sold in cast and wrought form. The development of nuclear power generation has created a new and expanding market for the metal in pure form, which may profoundly influence the economics of the industry. Beryllium is used in nuclear applications primarily because of its excellent stability under irradiation. Other outstanding properties are extremely lightweight, high corrosion resistant, with high modulus of elasticity. The three known materials which can be used most efficiently in reactor moderators and reflectors are heavy water, pure beryllium and graphite. Beryllium is the most desirable of them where compactness, high temperatures and low weight factors are involved. Largely as a result of the interest and sponsored programmes of the Atomic Energy Commission, the production and fabrication of beryllium in the U.S. has become less costly and much technical information of value to commercial users of beryllium metal and its alloys has been made available.

Indicative of beryllium's growing importance as a nuclear metal is the news that the Beryllium Corporation and Brush Beryllium, the leading firms in the U.S. beryllium industry, have each been awarded a contract by the A.E.C. to supply 250 s.tons of nuclear grade pure beryllium metal over a five-year period. The price will be about $47 per lb.

The new A.E.C. contracts are the result of approximately ten months of preparation and negotiations. Hitherto, the only sources of nuclear grade beryllium have been government owned, but in December, 1955, the A.E.C. announced plans to purchase beryllium metal from private industrial sources.

The Beryllium Corporation is the largest producer of beryllium oxide, the basic raw material used to make beryllium metal and beryllium copper alloy. Its A.E.C. contract, amounting in value to $23,000,000, represents its first large-scale entry into the new field.

Brush Beryllium is currently producing atomic reactor grade beryllium metal for the Atomic Energy Commission at a plant at Luckey, Ohio, which it operates for the government. It is at present the only industrial producer in the U.S. of atomic reactor grade beryllium metal and the only industrial fabricator of pure beryllium metal parts for atomic energy applications.

Beryllium Corporation officials predict that expanded research efforts resulting from the large tonnages to be produced under the new contracts will so improve the technology of fabrication that a further reduction in manufacturing cost can be expected, which in turn will substantially reduce the cost of future beryllium to both industry and government.

Meanwhile, steadily mounting costs of raw materials and manufacturing supplies have led to an advance in the prices of beryllium alloys. As from September 4, the base price of wrought and cast beryllium copper alloys has been increased by the Beryllium Corporation by 4 - 5 c. per lb. This represents a 2 per cent rise in the current selling price of beryllium copper strip, rod, wire and billets, and a 3 per cent rise in the price of beryllium copper casting ingots.

Potential Rival for Wankie

The annual report for 1955 of the Department of Geological Survey, Northern Rhodesia, records increased geological activity generally in the territory, not only by the department itself but also by the geological organizations of various mining companies in pursuance of the policy of large-scale prospecting over considerable areas.

Of particular significance, having regard to the Copperbelt's critical dependence on Wankie coal, are the promising results of the department's work in the Kandabwe coal area, near Choma, where a drilling programme was started in May, 1955. In seven months a total of 25 boreholes was sunk with an aggregate footage of more than 5,000 feet. These holes tested the persistence of the coal seam along the strike nearest to its outcrop, and down to varying depths, mostly to 100 ft. and 200 ft. Four holes were sunk to intersect the seam at approximately 500 ft. and one to do so at approximately 1,000 ft.

The field is approximately eight miles long and varies in

width from a mile to almost two miles, being widest at its two extremities and with a "waist" at its middle section near the Kandabwe River. The coal seam was explored for six miles of the total length of the field and the persistence of the seam was proved for five miles of that length. Down dip, and within this five-mile length of strike, the seam is persistent to all the depths probed. In the middle section, the seam thins slightly down to a depth of 500 ft., but only by 2 ft. in an average thickness of 16 ft.

Samples of coal from all the boreholes sunk were submitted for proximate analysis. Some of these analyses are now available. They appear to indicate that a greater thickness of the seam than was earlier considered probable, might produce coal averaging less than 20 per cent ash and with calorific values of about 11,000 B.Th.U.'s per lb. It seems possible that these figures might now apply to a thickness of up to 6 ft. from the base of the seam, although this may not be the case throughout the entire length of the field. A clearer and more accurate assessment will be possible when all the analytical results are available. Likewise, a more accurate computation of probable reserves will be possible when further holes of a depth in the region of 900-1,000 ft. have been drilled to collect information regarding the nature and thickness of the seam, spread over a greater length of the field.

Exploration of the Kandabwe coal area has conclusively demonstrated the existence of at least one coalfield in Northern Rhodesia. Still more information is required, however, before it is convincingly established that this coalfield is adequate in size and commercially workable. It is anticipated that this information will be forthcoming during the next field session.

Transport would appear to present considerable difficulties, and the coalfield though only 35 miles from the railway, lies at least 2,000 ft. below it down a steep escarpment. Nevertheless interest in the Kandabwe coal has already been expressed by one local mining company. In order to make available all relevant statistical information as soon as possible, an interim report is being compiled by the Geological Survey.

Obituary

NAPIER BALIOL SCOTT

It is with deep regret that we record the death in a road accident of Mr. Napier Baliol Scott, a director of *The Mining Journal Ltd.* Mr. Baliol Scott, who was in his 53rd year, was the son of a former editor of *The Mining Journal*, Mr. Edward Baliol Scott, and brother of one of the present Joint Editors, Mr. Ursel Baliol Scott.

An expert in organization and methods, he had a distinguished career in the field of business and public administration. Educated at Westminster School and Christ Church, Oxford, he worked for five years with the American firm of management consultants, Wallace Clark and Co., then practising in Europe as management consultants—largely in the field of factory management. Thereafter followed a period up to the war in which he devoted himself mainly to the problems of retail distribution.

After ten years in commerce he joined the staff of H.M. Treasury in 1939, becoming an under-secretary in 1948. During the war years he served H.M. Government in various capacities. In 1942 he was seconded to the Minister of State's Office, Cairo, and he was a member of the Bengal Administration Enquiry Committee which was set up in 1945. In 1952 he was appointed Director, Organization and Methods, Ministry of Supply. At the time of his death he held the position of Under-Secretary General, Ministry of Supply.

East Africa

(From Our Own Correspondent)

Dar es Salaam, September 5.

Complaints have been raised by a number of conservative bank-benchers at the amount of valuable dollar currency used in the purchase of American coal in order to bolster the flagging production of Britain's nationalized industry, and as a result interest in the coalfields of Tanganyika has been revived. There are several groups of coalfields in Tanganyika, but the largest, and the one on which most work has been done, is that in the Ruhuhu Basin. This area lies five miles from the shore of Lake Nyasa on its north-eastern side. Some years ago a project was mooted to build a railway connecting the Kenya-Uganda system with the Central Line of Tanganyika, running thence southwards to meet the Rhodesian Railways at Broken Hill—a plan involving some 1,200 miles of new line.

A market survey was made by Sir Alexander Gibbs and Partners, and to assist this the Colonial Development Corporation were asked to investigate the possibilities of the Tanganyika coalfields. They chose the coalfields of the Ruhuhu Basin as being the most promising, and after 3½ years of work during which 60,000 ft. of drilling was done they succeeded in proving considerable reserves. The Mchuchuma coalfield in this area has been shown by drilling to contain 125,000,000 tons of extractable coal down to 1,000 ft. depth. This excludes coal which would be left in pillars. The coal is of good southern-hemisphere quality, averaging nearly 13,000 B.Th.U. The four seams are of medium thickness and have strong roofs and floors. In the Mbalawala coalfield 65,000,000 tons has been proved, with a somewhat lower calorific value. In both fields the ash content runs at about 15½ per cent, and the sulphur at about 1 per cent. Another promising coalfield in this area has not yet been drilled.

OTHER POTENTIAL SUPPLIES

There is then, in the Ruhuhu Basin, a large potential source of supply, and all that is needed is a railway to get the coal to the coast. Tanganyika has already been provided by the "Groundnuts Scheme" with an excellent new port, Mtwara, and with a 100 miles of railway running inland from there to the old groundnut centre, Nachingwea. What is now required is to extend that railway straight inland to the coalfields, a distance of some 420 miles.

Rights over the coalfields are held by a company known as Tanganyika Coalfields Ltd., formed by the Colonial Development Corporation, the Anglo American Corporation of South Africa Ltd. and Frobisher Ltd. The Government of Tanganyika also have an interest. The abandonment of the project for the construction of the north-south rail link caused loss of interest in these coalfields, but this has now been raised again by the shortage of coal in Britain. Preliminary estimates have shown that were the Groundnuts Railway extended to the coalfields, coal could be landed in British ports at a competitive price.

The provision of such a railway would also stimulate interest in the titaniferous iron ores of Liganga, which are situated only 30 miles from the Mchuchuma coalfield. Here solid masses of pure titaniferous magnetite form a chain of spectacular hills extending over a length of six miles or more. It has been estimated that there are 15,000,000 tons of ore outcropping. Drilling to indicate the extension of these bodies beneath the surface, is now being done by the government's mineral exploration team.

Tests made on the ore in Sweden have shown that there need be no particular difficulties in smelting it.

LITHIUM—I.

World Lithium Resources

By C. K. G. LAMMING

The entry, in 1953, of Bikita Minerals into the lists as the largest lithium minerals producer completely altered the free world supply pattern of lithium and in the past few years, with the assurance of abundant supplies, lithium metal and chemicals have been steadily growing in demand throughout many sections of industry. Now, as plans for the development of several major Canadian sources and a processing plant gather momentum, it is possible to predict a further change in this pattern in the next few years. The following article, the first of two instalments, describes the composition, sources and producers of lithium throughout the world with the exception of the Western Hemisphere, discussed in the concluding article.

The main ore minerals are amblygonite, petalite, spodumene and lepidolite, with minor amounts of lithiophylite and zinnwaldite.

COMPOSITION OF PRINCIPAL MINERALS

Mineral	*Formula*	*Max Theoretical % Li_2O*	*Marketing grade % Li_2O*
Spodumene ..	LiA1Si206	8.03	4 - 7.5
Amblygonite.	(Li,Na)A1(PO4)(F,OH)	10.24	8 - 9
Lepidolite	..KLi2A1Si4010(OH)2	7.74	2.5 - 5.0
Petalite ..	LiA1Si4010	4.88	3 - 4
Tryphylite ..	Li(FeMn)PO4	9.53	

These minerals are found and they are exploited in pegmatites. Other minerals with which lithium ores may be associated are numerous. Tin, columbite, wolfram, monazite, zircon, beryl, topaz and felspar are a few of the economic minerals often recovered as by-products from some pegmatites.

Pollucite, an ore of caesium and rubidium has also been reported from lithium pegmatites as at Karibib in South West Africa and in the U.S.S.R., in the Kalbin range of the Altai Mountains.

Apart from its occurrence in pegmatites, lithium also occurs in certain brines, hot water springs and some kinds of marls and sedimentary rocks. Only in one instance, the Searles Lake, Mohave Desert California operation, is lithium recovered—from a brine reported to carry 372 mg. of LiCl per litre (.032 per cent LiCl).

Other brines of sub-economic concentration are known; for example at Durkheim in Germany (LiCl 39.1, RbCl 0.21, CeCl 0.17 mg. per litre), Great Salt Lake (4 mg. LiCl/litre), Saratoga Springs (0.08-0.16 per cent Li). A spring which was encountered in a fissure in the Wheal Clifford mine Cornwall gave on analysis LiCl 1,595.6, CeCl and KCl 90.90 gm. per cu. ft.

Salt deposits exist in New Mexico, Spain, Alsace-Lorraine, Stassfurt, Peru, Bolivia, Chile and Argentina.

WORLD PRODUCTION

(in tons)

	1927	1949	1950	1951	1952	1953	1954	1955
SOUTHERN RHODESIA								
Amblygonite	—	—	179	170	80	300	387	
Lepidolite	19	—	—	1567	1101	6859	24026	82166
Petalite	—	—	—	—	100	10339	23846	
Spodumene	—	—	—	—	40	40	—	
SOUTH WEST AFRICA								
Amblygonite	—	116	261	516	637	302	1172	1414
Lepidolite	250(*c*)	799	8320	9902	7066	7538	4178	1832
Pedalite	—	120	161	155	1048	1427	1936	5278
UGANDA								
Amblygonite	—	200	265	19	—	16	7	(*a*)
UNION OF SOUTH AFRICA								
Lithium Ores	—	—	13	—		54	57	426
AUSTRALIA								
Petalite	—	5	—	—		—	15	(*a*)
CANADA								
Lithium minerals	21	—	—	—	—	—	17,052(*b*)	108,056(*b*)
U.S.A.								
Lithium minerals	3726	4320	8309	11515	13938	24321	(*a*)	(*a*)
PORTUGAL								
Amblygonite	90	18	10	17	10	16	9	(*a*)
Lithiophylite	—	—	6	49	—	—	—	(*a*)
Lepodilite	213	—	—	—	—	—	—	(*a*)
SPAIN								
Amblygonite	—	—	—	—	10	31	(*a*)	(*a*)
FRANCE								
Lepidolite	300	(*a*)	(*a*)	(*a*)	(*a*)	(*a*)	(*a*)	(*a*)
GERMANY & CZECHOSLOVAKIA								
Lithium minerals	650	(*a*)	(*a*)	(*a*)	(*a*)	(*a*)	(*a*)	(*a*)
MOZAMBIQUE								
Lepidolite	(*a*)	590	218	275	1083	5622	(*a*)	(*a*)
BELGIAN CONGO								
Amblygonite	—	—	—	—	—	—	365	(*a*)

(*a*) figures not available. (*b*) lbs. Li_2O. (*c*) production for year 1930.

Concentrations in an impure magnesite in the muddy mountains of S.W. Nevada range from 0.17 to 1.77 per cent Li_2O whilst clays at Hector, California, carry from 0.60 to 1.12 per cent Li_2O. Sedimentary deposits generally appear to have been neglected as a source of lithia, although it is believed that certain types of deposit may carry appreciable amounts.

In the U.K. certain aplites in Devon carry petalite and the overall grade is believed to be in the region of 0.8 per cent Li_2O. Large crystals of spodumene occur in pegmatites near Peterhead and other occurrences have been reported from Killiney.

In order to establish an economic deposit, however, large tonnages of ore in a grade of not less than 1.00 per cent Li_2O are necessary at locations not too far remote from shipping or processing facilities and currently only one firm appears to have entered lithium chemical production in the United Kingdom.

DEPOSITS IN AFRICA

Southern Rhodesia : Original interest centred on a large pegmatite dyke over 2,000 yd. long by 900 ft. wide containing amblygonite, lepidolite, petalite and spodumene with some beryl. Further deposits occur near Salisbury, in the Umtali, Mtoko, Insiza, Matobo and Mazoe districts.

Lithium mineral production at the rate of 7,000 tons/month is now reported to be approximately evenly divided between lepidolite and petalite with some amblygonite and small amounts of spodumene.

On May 1 this year the production of lithium carbonate was recommenced after the £100,000 plant at Gwelo had been shut down for a few weeks to enable re-organization to be effected. Output has now been trebled to meet a greatly expanded demand.

Uganda : Production of amblygonite from surface detritals has now dwindled to an insignificant amount. The mineral was first reported at Gamba Hill in the Busiro district, occurring in masses up to a foot in length, associated with quartz.

South West Africa : Lithium bearing pegmatites in the Karibib district of South West Africa yield lepidolite in large masses together with amblygonite and petalite. The deposits occur over a wide area, roughly 80 miles by 70 miles, the main deposits being located within a 25 mile radius of Karibib.

In 1946 the Karibib deposits were estimated to contain 60,000 l.tons of lepidolite of which more than 50,000 tons assayed better than 4 per cent Li_2O. Further prospecting at that date was expected to increase this figure.

During recent years lepidolite production appears to have lost ground, whilst a marked increase in the production of petalite is noticeable. South West Africa Lithium Mines have taken over the Jooste property, although the Jooste Lithium Mine and another property at Omaruru to the north are listed as producers of pollucite, a rich source of caesium and rubidium associated with lepidolite. A representative sample of several hundred tons of pollucite assayed 2.2 per cent Rb2O.

Union of South Africa. Pegmatite dykes carrying lepidolite and spodumene occur in the Jackals Water district of Little Namaqualand. Spodumene crystals up to 4 ft. in length are reported to be associated with tantalite, columbite and beryl. A small shaft sunk in the 1920's disclosed a rich orebody but development in the area has been neglected until recently. Spodumene is reported " in appreciable quantities " at Spodumene Kop, Norrabees and at Noumaas where it is reputed to occur in logs up to 5 ft. in length and to form over 40 per cent of the pegmatite body. Good quality lepidolite exists in the East Transvaal. 426 tons of lithium ores were produced in the Union during 1955, together with 12 tons of tantalite and 137 tons of beryl.

Although one of the three isotopes of lithium is radioactive its occurrence would probably not be in sufficient quantity to account for the radioactivity of both the Union and Karibib lepidolite and this is probably due to the presence of small amounts of uraninite, euxenite, etc., which are known to occur.

Mozambique : Low grade lithia and high manganese content combined with poor accessibility mitigate against the development of lepidolite in this territory although production has increased substantially in recent years.

Madagascar : Deposits of lepidolite occur in the Maharita, Antsongbomato, Ambondromany and other districts.

Belgian Congo : Deposits of amblygonite are reported to rank among the world's largest. Production by Geomines started in 1954. In 1952 this Company patented a process for leaching lithium compounds from its tin/spodumene pegmatite ore after a preliminary calcination in the presence of an alkali or an alkali earth hydroxide.

THE EUROPEAN SUPPLIES

France : Amblygonite and montebrasite (in which the F radicle is replaced by OH) occur in stanniferous pegmatites at Montebras, small lenses of up to 40 ft. in length and 10 ft. wide being reported.

Lepidolite from Limoges, La Cheze, Chedville, Larmont Castlenau-de-Brassac, Tarn and other sources accounted for a production of over 3,000 tons in the 4 years up to 1929. One vein in the Limoges district has been traced for over 5,000 ft. with a width of 6 ft. and a lithia content averaging 2 per cent Li_2O.

Germany and Czechoslovakia : Lepidolite and zinnwaldite have been produced from the retreatment of tin mine dumps. In Moravia lepidolite has been produced from a rich pegmatite on Mount Hradisko. In the 5 years from 1925 to 1930, 3,558 tons of lepidolite were produced in Germany, mainly from Saxony. At this time, Germany was the leading world producer of lithium salts and metal.

Sweden : Petalite, spodumene and lepidolite occur in pegmatites at UTO, the former mineral from this source providing the material for the discovery of the element by Arfvedson in 1817. Production of amblygonite from the Varatrusk pegmatite and other sources continues.

Spain : Lithium-bearing marls in the Montana de Carceres are reported to be associated with tin/lithium-bearing quartz veins. A small output of amblygonite from the Carmelita mine was reported at the turn of the century, whilst in 1952 and 1953 a total production of 41 tons of amblygonite was reported.

Portugal : Amblygonite has been produced as a by-product in tin mining near Pinhel in the Minas de Massiume. Other sources of lithium minerals are at a number of places in the northern part of the Beira district and at Belmont and Garad, both to the south of the city of Guarda, where lepidolite has been mined.

U.S.S.R. : Lithium minerals occur in the Transbaikal Territory on the Amur river in Siberia and in the Kalbin range of the Altai Mountains.

Australia : In the Northern Territories renewed prospecting activities are reported and at least two deposits occur in the vicinity of Bynoe Harbour. Lepidolite, amblygonite and spodumene also occur in the tin/tantalite field of Western Australia. A small output of petalite from the Londonderry-Coolgardie goldfield was recorded in 1954 and a trial shipment of spodumene was reported from Ravensthorpe.

Use of the Centrifugal Concentrating Pan in Alluvial Mining Operations

The centrifugal concentrating pan has been used extensively for many years in diamond recovery and now has begun to find favourable application in the field of alluvial mining. The following article describes the unit and its use in this more recent context.

In the field of alluvial mining, attention has been turning recently to the use of what might almost be termed a power assisted cyclone. This tool is the centrifugal concentrating pan, used for many years in diamond recovery with conspicuous success. Its salient features are high throughput, high concentration ratio and remarkably high efficiency (96-98 per cent under normal operating conditions).

A detailed account of the operation of the pan was given in 1932 by C. W. Walker. Since that time, pan diameters have increased and certain refinements have been made but in essence the principles remain the same.

A TYPICAL INSTALLATION

A typical pan is the 8 ft. dia. unit capable of treating 70 yd. per 8 hour shift, although larger sizes are common. For prospecting and mobile mining, 4 ft. or 5 ft. dia. units may be trailer mounted.

The 8 ft. pan consists of a circular channel 2 ft. 9 in. wide, the outer wall being 14 in. high and the inner wall 11 in. high. An opening 15 in. wide and 9 in. deep allows tailings to discharge through the inner wall, whilst a cam-operated gate controls the concentrate discharge through a small opening in the outer wall. Eight radial horizontal arms, driven through a vertical shaft mounted in the open centre of the pan, each carry five vertical tynes and rotate at 13 r.p.m. The tynes, triangular in cross-section (1 in. x 1.5 in. x 1.75 in.) are arranged in the form of a spiral, the leading tyne being circular in cross section. The gap between the floor of the pan and the ends of the tynes is usually 1 in. except for the leading round tyne, where the gap is only ½ in., thus creating a groove when the pan is in operation.

When treating ground at the rate of 70 yd./day, water consumption is almost 60 gal./min. Where a very free wash type of gravel is concerned, or where water is scarce, it may be of advantage to recirculate the water.

Walker, in his note, described four major forces contributing to the concentrating action :

(a) A radial/tangential component derived from the feed inlet at the side of the pan, a force which varies with the quantity of gravel and water admitted and with the density of the puddle formed in the pan;

(b) A pressure difference due to the tailings discharge in the inner wall. This force tends to cause all particles to move towards the centre;

(c) Centrifugal force induced by the vortex created by the stirring motion of the tynes—a force which, for each particle, varies directly with the mass, the square of the angular velocity and the radius;

(d) The settling effect in a media of variable density but with an average value of 1.08.

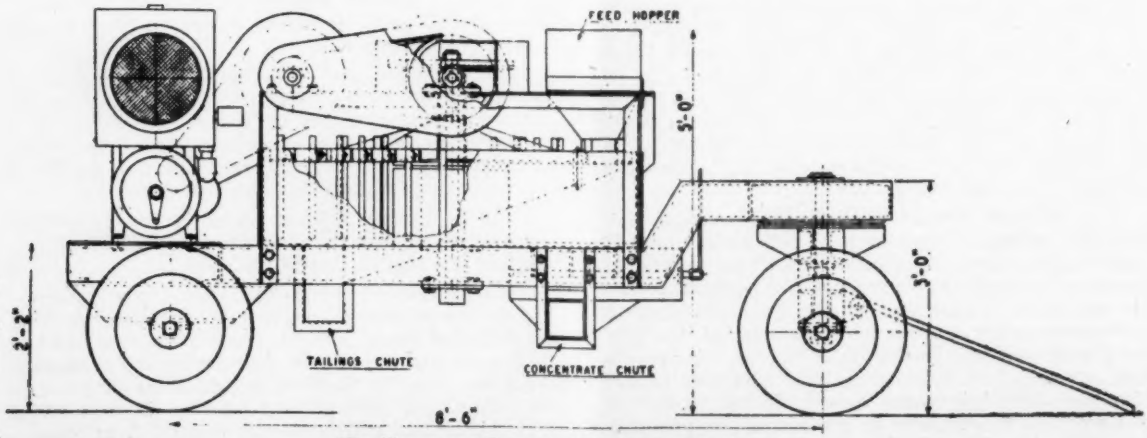
To summarize the effect of these forces, the first tends to keep the heavier and larger particles at the perimeter whilst the third and fourth also tend to pull any particles which find their way to the centre of the pan downwards and outwards again to the perimeter. The second force is that which carries off the tailings and would carry off the concentrate were it not for the opposing forces.

From this, of course, it can be seen that accurate control of feed, density of puddle, tyne setting and speed, and tailings gate discharge setting are essential.

IMPORTANCE OF ACCURATE CONTROL

Factors influencing feed control are not only type and quantity of gravel per hour but also the quantity of water fed. Obviously, the greater the rate of feed the greater the tailings discharge and at excessive rates values may appear in the tailings, whilst, if carried to extremes, gravel may slop over the outer wall of the pan. In practice, about 9 cu. yd. (solid meas.) of gravel per hour for an 8 ft. dia. pan is common for ground with values up to 80 lb. concentrate per cu. yd. with rather higher rates for ground with values well below this.

In gravels of low clay content, a rather thin puddle is produced and although this enhances the settling effect, in practice it is sometimes preferable to boost the puddle

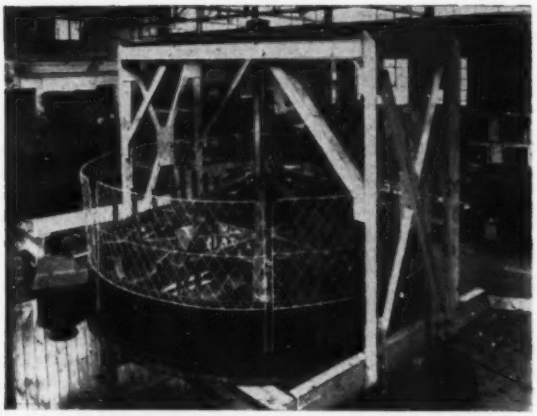


The Knapp and Bates centrifugal concentrating pan

thickness by adding further clay or re-circulating the water. Too thin a puddle will also create too hign a vortex angle and cause overspill of the gravel at the outer wall.

Where the clay content is high, however, too thick a puddle may be produced and here either the water content may be increased and the feed reduced or some measure of pre-washing may be used. The effect of too little water, when carried to extreme will be to cause values in tailings to appear and ultimately to jam the tynes, causing the pan to stop working.

The speed and setting of the tynes are important factors. The setting, which should be 1 in. above the floor of the pan, governs the formation of the bed, whilst the lower setting of the leading round tyne should only be ½ in. above the floor, this forming a groove to receive the concentrates. In practice, the bed will also consist largely of concentrate and when the pan is used for treating bulk samples, this bed must be thoroughly cleaned up. Uniform height of the tynes above the floor of the pan is essential to prevent other grooves forming than that at the perimeter.



An 8 ft. dia. Knapp and Bates centrifugal concentrating pan assembly, showing the radical arms that carry the vertical tynes and the concentrate discharge outlet to the left of the assembly

Tynes usually require changing at the end of a week's run, due to wear. They are not scrapped, however, but shortened and re-shaped and may be used several times, according to original length.

Too great a height of the tailings discharge gate, as with too thin a puddle, will cause the gravel to slop over the side of the pan. Usually with an 8 ft. pan having an external wall of 18 in. and a tyne speed of 13 r.p.m., the setting of the discharge head is from 3.5-5.5 in.

STATIC OPERATION

For static operating practice, it is often found advantageous to use pre-washing trommels and to operate pans in a combination of series and parallel arrangements or any one of these. Concentrates from the final pan are usually jigged, fine concentrates being tabled.

In mobile use, the smaller, trailer-mounted, units may also be preceded by trailer-mounted trommels and followed by jigs and a table. It should be noted, however, that the greater bulk of concentration is effected in the pan and that for many gravels, especially those now treated by hand labour, as for example, in the Kaf an Chans or sluices of the Nigerian Plateau, with consequent high loss of ore, the pan presents very great attractions with regard to low installation cost, simplicity of maintenance, mobility and outstandingly high recovery.

South Africa's Rising Physical Volume of Mineral Production

The total physical volume of mineral production in South Africa increased by approximately 16 per cent during 1955. Preliminary figures reveal that the Union's total mineral output—excluding quarry products but including exports of uranium—rose to the new high level of some £283,000,000 in 1955 compared with about £244,000,000 in 1954 and £215,000,000 during the previous year.

Of the advance of about £39,000,000 from 1954 to 1955, no less than approximately some £18,000,000 was accounted for by gold and about £15,000,000 by uranium. Not only the more traditional precious metals showed this upward trend. Sales of coal improved from 31,302,000 tons in 1954 to the new high level of 32,643,000 tons last year. In terms of value, this lift may be translated as from £16,300,000 to £16,900,000. Simultaneously, the value of copper sales moved up from £9,800,000 to £12,400,000, although the amount sold declined from 49,100 to 47,800 tons. The combined sales of all other base minerals improved from £17,600,000 to £20,200,000, those of precious metals, excluding gold and uranium, from £7,300,000 to £7,700,000, while those of diamonds fell from £13,200,000 to £13,100,000, or from 2,891,000 to 2,633,000 metric carats.

As far as the physical volume of mineral production is concerned, preliminary estimates indicate that the output of precious metals, mainly gold and uranium, expanded by approximately 19 per cent, that of base metals by about 5 per cent, and that of non-metalliferous base metals by some 14 per cent. On the other hand, the output of diamonds dropped by approximately 10 per cent, so that the total physical volume of mineral production soared by about 16 per cent.

CURRENT PRODUCTION SHOWS CONTINUED INCREASE

In so far as gold is concerned, this movement is being carried strongly into 1956, as record gold production for the first six months of this year is reported by the Transvaal and Orange Free State Chamber of Mines. With a total of 7,757,670 f.oz. for the half year, valued at £96,497,856, gold output exceeded that of the first six months of 1955 by 638,648 f.oz. and earned £7,311,487 more in foreign exchange for the Union than in the comparable period last year, even though the actual price realized last year was higher by 1s. 9½d. per f.oz. Indeed, for the first time in its history, the South African gold mining industry's monthly output has surpassed £17,000,000, a highly interesting statistic that was revealed in the returns for July when production was 18,268 oz. more than June's record production of 1,351,465 oz.

Regarding other minerals, it is reported that output of coal, copper, asbestos, chrome and manganese ore during May passed the production quota of the comparable period of 1955, and was also higher than the monthly average output during the period June, 1955, to May, 1956.

Yet net sales of diamonds by the Central Selling Organization on behalf of South African and other producers dropped by £3,300,000 in the first half of 1956 from the total of £39,400,000 reached in the corresponding period last year. Gem diamonds this year have realized £24,100,000 and industrials £12,000,000. The decline is attributed to a reduced market supply of diamonds, although demand for gems is reported to have remained strong.

Current Activity in the Coal Mining Industry

American Coal Shipping Incorporated, the recently established U.S. Coal Co-operative Organization, is meeting strong opposition from private shipping interests. This $50,000,000 combine, composed of coal producers, the United Mineworkers Union and Southern Railroads, came into being because of the contention that present rates of private shipping lines are too high and might price American coal out of the European market. However, due to the virtual dependence of Europe on U.S. coal imports it seems likely that a more creditable *raison d'être* for Coal Shipping Incorporated is a not unnatural desire for the combine to share in the coal shipping boom and whether the competition leads to lower freight rates remains to be seen.

Further incensing the regular shipping companies has been the combine's proposals to use the same ships to carry back to the U.S. cargoes of iron ore and manganese, among other raw materials. Private shipping interests have strenuously objected to this use of the government-owned vessels which the combine is seeking permission to lease. Despite these objections a Federal Maritime Board examiner has recently recommended that American Coal Shipping Incorporated be permitted to charter 30 "moth-balled" liberty ships from the Government subject to certain conditions. These include minimum rates, restrictions on use of the vessels in other trades and limiting the charter to 12 months. The examiner's recommendation is subject to a decision by the full Maritime Board.

The chairman of the combine has stated that the chartering of the 30 liberty ships is only a temporary expedient and that the Coal Co-operative Organization is counting on the construction of large new colliers.

From Canada comes news that negotiations on the sale of Canadian coal to Japan (now in progress) may eventually bring new life to the collieries in Alberta and British Columbia. At the moment Japan buys most of her coal from the U.S. and Canada has been unsuccessful in previous attempts to sell coal there. The Canadian Minister of Mines has said that whilst there is nothing definite as yet, he is hopeful of success.

Japan's main need is for coking coal for steel furnaces and the Japanese have made it quite clear that Canadian coal purchases will depend on Canada's willingness for reciprocal purchase of steel and heavy industrial goods. Japanese steel works are very short of coke and the Canadian negotiations follow closely upon the contract between China and Japan whereby the former country is to supply rather more than 500,000 tons of coking coal within the next 12 months in exchange for Japanese steel products.

SOVIET COAL SHORTAGE

Despite the amazing recovery of the Soviet coal industry in the first post-war decade, this country, too, is experiencing similar trouble to that of Western Europe—industrial activity outstripping coal production. The Russian fuel gap is estimated at 12,000,000 tons per year despite the fact that some 209,000,000 tons of coal were mined in the Soviet Union in the first six months of this year—10 per cent more than in the corresponding period of 1955. The shortage is concentrated in the industrial areas west of the Urals and strenuous efforts are being made to accelerate the shift of coal consuming industrial plant to the east of the country with its larger coal, oil and hydroelectric power potentialities. Additional measures include the speeding up of construction of atomic power stations, gas trunk lines, and conversion of the railways to oil-burning locomotives.

Similar problems stunting the growth of the second largest Communist coal industry, that of Poland, are at the root of measures taken in Warsaw recently. Conscripts are given the option of volunteering for the mines to work there during their period of enlistment. The Soviet coal crisis, particularly in the western areas of the U.S.S.R., has greatly increased Russia's demand for Polish coal and lent the new measures to step up production in Poland their sense of urgency.

BELGIAN SEMI-NATIONALIZATION PLAN

The Belgian Government is considering a plan for the "semi-nationalization" of the coal mining industry. Consideration of this plan has no doubt been precipitated by the disaster at Bitter Heart Colliery last month in which 263 miners lost their lives. It is believed that semi-nationalization would satisfy public opinion by providing centralized responsibility which, among other tasks, would improve safety measures in Belgian mines. The scheme is expected to be operated along the lines of the centralized electricity supply industry introduced last year and so does not involve any transfer of the mines to public ownership. The pattern set in the electrical supply industry involves a control board on which the employers and unions are represented, each supplying the Chairman in turn. The Government is represented by a single member of the Board.

Actual management of the collieries would be in the hands of a single management board for the whole industry acting under the directions of the Government on a number of points including appropriate safety regulations. Whilst the Belgian mineworkers' union desire full nationalization of the mines this compromise measure is expected to have the approval of the miners' leaders.

The Ruhr coal industry is faced with an annual loss of 6,500,000 tons of coal by the demand of the miners' union to cut out 15 working days a year, with effect from October 1. A corresponding rise in hourly wages is demanded.

The reduction in the number of working days will be brought about by the curtailing of some Saturday working and ultimately it is expected that the union will press for a universal five-day week and the reduction of working hours to a seven-hour shift.

The immediate effect of the 15 days lost output, in the opinion of mine-owners would be an increase in imports of costly U.S. coal from 850,000 tons to about 1,200,000 tons per month; a further cut in exports; and an increase in official pithead prices unless the Federal Treasury decided to make fresh concessions.

SOUTH AFRICAN COAL DIFFICULTIES

A commission is to be set up in South Africa to investigate the question of establishing an atomic power station in the western Cape Province, the part of the Union furthest from the source of coal. The transport of coal to those areas away from the coalfield has always been a heavy drain on South Africa's transport system and that is why the western Cape has been chosen as a prospective site of a nuclear power station. It is expected that initially the power from such a station will cost a little more but it would pay to relieve the railways of the burden of hauling coal from the north.

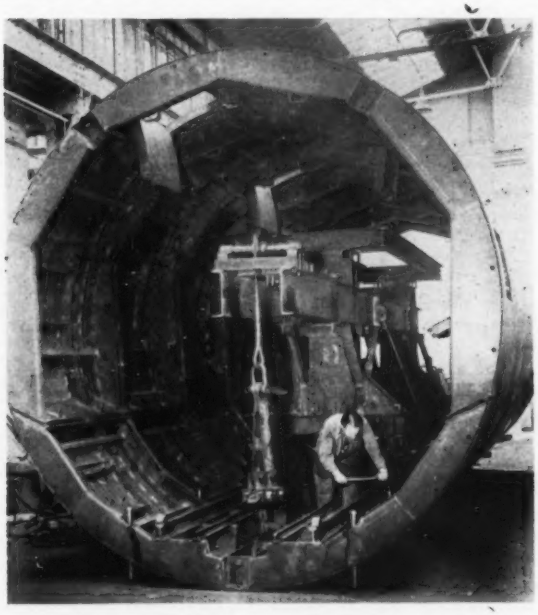
MACHINERY AND EQUIPMENT

A Steel Tunnel Shutter

An ingenious shuttering system for the lining with concrete of a tunnel at the North of Scotland Hydro-Electric Board's Breadalbane project has been designed by Edmund Nuttall, Sons and Co. (London) Ltd., the civil engineering contractors.

Nuttals are at present engaged in driving a five mile long, 13 ft. 5 in. dia. high-pressure tunnel on the Killin section of the project. When completed this will be lined throughout with concrete. Lining will commence later this year with the aid of a 240 ft. steel shutter divided into 15 ft. sections. This is being constructed by Birwelco Ltd. It is of all-welded construction and is being fabricated in 5 ft. units, three units being bolted together to form a 15 ft. length.

As no stunt end shutters are employed, a sufficient length of shutter is required to support the concrete, which is placed continuously and allowed to find its natural slope at the leading



General view of the shutter showing the front end of the traveller

end of the circular shutter. The 15 ft. lengths are divided into invert and top sections. The invert sections are hinged at the centre and the top sections are hinged at the two shoulder points so that the complete circle can be collapsed on to a travelling carriage which takes a 15 ft. length from one end of the shutter to the other.

The shutter is supported on steel spuds which can be screwed up or down for levelling purposes. Similar spuds are provided at the shoulders to stop any tendency to float. It is estimated that with the use of this shutter it will be possible to line the tunnel at a rate of beween 1,200 and 1,400 ft. per week. The consulting engineers are James Williamson and Partners.

Geophysical Exploration at Sea

Claimed by the operators, Seismograph Service Ltd., to be the only British ship specifically fitted out for geophysical exploration at sea, the *s.s. Seislim* was originally an R.N. Flower Class corvette.

s.s. Seislim is specially equipped for seismic geophysical exploration, the size of the ship being such as to allow it to travel completely manned and equipped to any part of the world. Indeed, the ship is equipped with a heliport, from which helicopters can land and take-off whilst the ship is at sea. This enables the seismic records to be collected in the minimum of time without obliging the ship to return to port and thus allows close liaison and direction for detailed surveys. To handle the floating seismometer cable, special winches and a cable handler are mounted on the ship so that the shooting and recording operations can take place whilst the ship continues on course at a constant speed. The seismometer cable itself extends for rather more than half a mile behind the ship when it is in operation.

As the survey cover of an interesting area must be complete, investigations frequently have to extend over the shallowest waters in order to tie with land lines and *s.s. Seislim* carries two shallow draught 40 ft. 100 h.p. diesel motor launches.

s.s. Seislim returned from operations in the Far East, Africa and the Mediterranean earlier this year and since that time it has been undergoing a major marine refit. The opportunity was also taken to modify and introduce improvements in the seismic technique. These include two new types of seismometer cables to improve operational speed and quality of results. One of the cables will use Velocity type seismometers mounted on newly designed paravanes and the second cable will use Gulf pressure type seismometers streamlined into a new floating cable. In addition, a magnetic recording unit has been installed to record the seismic energy and thus allow greater interpretational scope of the recorded data.

Improved Tub and Mine Car Controllers

The increased demand for minerals has necessitated a higher degree of mechanization in mines than was originally envisaged, and in the field of haulage cars of much increased capacity have largely replaced the traditional tub. In order to meet this expansion of output and increase of car size and weight, Hadfields Ltd. have improved their tub controllers. These new improvements are described in an interesting brochure recently released by the manufacturers.

Special purpose automatic rigid type controllers have been designed in halves, which can be set at any distance apart but operate as one unit, and thus allow for the passage of pipes, hydraulic rams and trailing couplings. One of the many applications of the tub controller is that fitted in pit cages the device anchors the cars during winding and allows them to be passed in or out of the cage in either direction.

Other improvements have been made to the manufacturers' rigid type and spring loaded controllers. The flat spring upon which the square boss operated has been replaced by a special steel plate having an Era manganese steel face and mounted on synthetic rubber blocks. These blocks do not perish in contact with oil and grease, and thus increased efficiency and larger working life has been achieved. By hardening the corners of the square boss this part is more impervious to wear, while the introduction of grease nipples lubricates the star wheel spindle and the operating spindle.

The spring-loaded machine is designed to absorb the shock of oncoming cars and to prevent bent axles. It has found extensive application in front of cages both on the surface and underground, at the approach to tipplers, and at conveyor loading stations.

A New Loader

With the power and lift of a crawler tractor mounted loading shovel, the new Allis-Chalmers Tractomotive Tracto-Loader Model TL-12D combines the handyness and speed of a rubber tyred tractor. It thus has possible surface applications within the mining industry.

A 70 h.p. 6-cylinder diesel engine, driving all four wheels through a hydraulic torque converter, gives up to 25 m.p.h. on the road and provides ample power for lifting the loaded 1¼ cu. yd. bucket from the ground to its 10 ft. maximum height in 7 seconds. The rear wheel steering turns the TL-12D inside a 19 ft. 10 in. radius.

MINING MISCELLANY

Intersections of the order of 8 per cent copper across a width of better than 50 ft. are being obtained by Kennarctic Explorations, which has had two diamond drills at work in the eastern Arctic since last May, in an area some 30 miles south of Bathurst Inlet. Kennarctic is owned 80 per cent by Kennecott Copper Corporation and 20 per cent by Hudson's Bay Co.

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A Canadian mining company has taken an option on the Bonmahon Copper Mines in County Waterford. The name of the company has not yet been disclosed. Bonmahon Mines were closed 50 years ago but have recently been under investigation by Canadian interests. The option requires a payment of $100,000 for a preliminary exploration and it is understood that this sum has already been paid.

* * *

Mr. Barend Schoeman, South Africa's Transport Minister, recently visited Swaziland to investigate the practicability of building a new railway line through the Protectrate to connect Eastern Transvaal with Northern Natal. The railway to Durban, though doubled, is approaching saturation point and the port of Lourenco Marques—which handles large tonnages of coal and mineral exports—in the Minister's words, "is chronically congested." Mr. Schoeman said that at least £20,000,000 would be required for the scheme to develop Sordwana Bay as a new port and link it by rail to Swaziland and the Eastern Transvaal. The estimated cost of the line is £3,000,000.

* * *

The American Smelting, Refining and Mining Co. is increasing its Canadian investments. Approximately $55,000,000 is being spent by two Canadian subsidiaries, Lake Asbestos of Quebec Ltd., and Federated Metals of Canada Ltd. Lake Asbestos is investing more than $32,000,000 to develop asbestos ore bodies at Black Lake and to construct a modern fibre mill. Federated Metals is opening new non-ferrous metal refineries at Toronto and Montreal during September and October. The new plants will refine non-ferrous white metals and will produce solders, Babbit metals and lead products. Growing Canadian industry will use almost all Federated production, it has been stated, a small percentage of the output being exported. Lake Asbestos, however, will sell approximately 80 per cent of its production to U.S. industry.

* * *

A British delegation has been invited to take part in the conference of the six member nations of the European Coal and Steel Community which, following the recent Belgian pit disaster at Marcinelle, will be reviewing coal mine safety measures in the six countries. The delegation will be headed by Mr. A. M. Rake, C.B.E., Under Secretary in charge of the Safety and Health Division of the Ministry of Fuel and Power. The other members will be Sir Harold Roberts, K.B.E., M.C., H.M. Chief Inspector of Mines; Mr. William Reid, production member of the National Coal Board, and Mr. Edward Jones, vice-president of the national Union of Mineworkers. The British delegation will attend the first meeting of the conference, which will be held in Luxembourg on September 24. Other experts will be appointed as necessary to assist the work of the conference.

PERSONAL

Mr. M. W. Rush has been elected a director of Grootvlei Proprietary Mines in place of Mr. H. F. Oppenheimer.

* * *

The board of Hartebeestfontein Gold Mining Co. Ltd. has been reconstituted and now consists of Mr. B. L. Bernstein (chairman), Mr. S. G. Menell, Mr. Anton Gray (U.S.), Mr. R. B. Hagart, Mr. L. P. Kent, Mr. R. F. Lapping, Mr. C. S. McLean, Mr. J. Scott and Mr. J. W. Shilling.

* * *

The board of Rand Leases (Vogelstruisfontein) Gold Mining Co. Ltd., has been reconstituted and is now as follows: Mr. S. G. Menell (chairman), Mr. B. L. Bernstein, Mr. J. Boyd, Mr. B. E. Hersov, Mr. L. P. Kent, Mr. H. C. Koch, Mr. J. D. MacKenzie, Mr. K. Richardson and Mr. D. A. B. Watson.

* * *

Mr. Hector R. Mackilligin has been elected chairman of the Kaduna Syndicate Ltd., and of Kaduna Prospectors Ltd. in place of the late Captain Hugh Vivian.

* * *

Mr. D. T. Lewis has relinquished his office as chairman of the Pahang Consolidated Co. Ltd., but remains a director. Mr. G. H. Fairmaid, managing director of the company, has been elected chairman.

The Iron Masters' Federation has awarded the Rinman Medal to Mr. Erik Ryd, technical director of the Atlas Copco, AB., for his outstanding achievements in the field of rock drilling, which led to the development of "The Swedish Method." The Rinman medal, which bears the inscription "for meritorious mining achievement," has been awarded on only 21 occasions in the past 38 years. Mr. Ryd has been closely concerned with the introduction of light-weight drilling equipment by Atlas Copco (Great Britain), Ltd., which is the oldest associate company in this world organization.

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Mr. N. W. Chisholm, general manager of the National Bank of India Ltd., has been appointed a director of the Bank.

* * *

Mr. Leonard Coe Scruggs (U.S.A.) has been appointed a director of Premier Consolidated Oilfields Ltd.

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The death has occurred of Mr. R. C. Plowman, who, before he retired in April, 1949, was executive director of the British Thomson-Houston Export Co. Ltd. Mr. Plowman was with the company for 30 years.

* * *

The annual general meeting of the North Staffordshire Institute of Mining Engineers will be held in the North Staffs. Technical College at 5.30 p.m. on October 1, 1956.

* * *

The British South Africa Company announce that their present offices on the first floor of 11 Old Jewry, E.C.2, will be closed at 12 noon on Friday, September 21, in order to enable them to move to their new offices on second and third floors of the same building. On and after Monday, September 24, persons having business with directors, the secretary or the investment manager should call at the third floor. The reception and general offices of the company will be situated on the second floor, where all other callers should apply. The company is a subscriber to the Telex service and its Telegraphic address has been altered to Charter, London Telex.

* * *

The Battelle Institute Ltd. has changed its address to 24 Ryder Street, St James's, London, S.W.1. Telephone, Trafalgar 1621.

* * *

Ransomes and Rapier Ltd. are now users of the Telex system of communication, their call number being 27-2600 Rapier, Ipswich.

CONTRACTS AND TENDERS

Orders for British drilling equipment have been placed by Impresit South Africa (Pty.) Ltd., the Italian group of contracts responsible for major sections of the Kariba hydro-electric scheme in Rhodesia. Rock drills made by Holman Bros., Ltd., of Camborne, will be supplied for such vital parts of the scheme as the underground power station to be cut from the rock of the Zambesi Gorge. Plant will be supplied from the firm's South African factory at Johannesburg, which already supplies more than half the rock drills in use in the Rhodesias. Delivery and service will be arranged from a special depot at Salisbury. Similar equipment is already in use at the site, for the Cementation Co. Ltd. are using Holman drills for the diversion tunnel. These will be taken over by the Italians when this tunnel is completed.

* * *

The National Coal Board, North Eastern Division, has placed an order with the Woodall-Duckham Construction Co. for a new battery of coke ovens to be bult at the company's Glasshoughton Works. The battery will consist of 42 W-D Becker Coke Ovens capable of carbonizing about 850 tons of coal per day and will include the necessary coal handling plant.

AGENCIES WANTED

Feedback Control, Inc., 899 Main Street, Waltham, Mass., U.S.A. are interested in representing U.K. manufacturers of electronic (other than communications) equipment who are not already represented in the U.S. Manufacturers interested should write by air mail direct to this company, quoting c.i.f. prices in U.S. currency. It would be appreciated if a copy of the initial correspondence is sent to the British Embassy, Commercial Department, 3100 Massachusetts Avenue, N.W., Washington 8, D.C. B.O.T. ref., ESB/25113/55. Telephone enquiries to Chancery 4411, Extension 776.

METALS, MINERALS AND ALLOYS

COPPER.—Copper has remained fairly steady in the United States in the past week and the market has paid little attention either to the Suez crisis or to the trouble on the copperbelt. The producers are still pricing their output at 40 c. per lb., with the custom smelters at 39 c.; the price for No. 2 scrap metal after remaining constant for some time at 32.50 fell during the week to 31.50 c. per lb. The factors to which the trade in the United States has been inclined to attach the most weight are in fact bearish. On the one hand production is still outstripping consumption; news from Chile is good; stocks held in and outside the country are still rising. On the other hand demand from the brass mills, which was expected to pick up smartly in September, has not much improved. The expectation was based on the fact that production was due to start on the 1957 model automobiles. In fact the automobile makers have not increased their buying rate and the brass producers are puzzled by the lack of orders from Detroit. Nevertheless it is a tribute to Suez and the copperbelt as background market factors, and to their effect on the London market, that this bearish sentiment in the United States has not produced any noticeable weakness in prices.

August figures show that the output of crude copper in the United States reached 100,369 tons against 95,174 tons in July; output of refined copper fell slightly from 125,401 tons in July to 122,108 tons in August. Domestic deliveries were up on the month from 97,698 to 110,128 tons. Stocks rose from 87,944 to 96,450 tons. Stocks also rose outside the United States from 215,281 tons in July to 218,793 tons at the end of August. Crude copper output was 149,530 tons against 148,395 tons in July and only 127,405 tons in August, 1955. American smelters and producers say that demand for September will take delivery figures above those for August but demand for October is not running above September's level as yet. There is, however, plenty of time for improvement.

In the copperbelt the position is that the call to return to work made by the President of the African Mineworkers' Union, Mr. Katilungu, is being heeded and there has been an almost complete turnout. The general situation on the copperbelt is discussed in Notes and Comments

From Chile it is reported that output from the big American mines is increasing sharply. The monthly output from Chuquicamata in the first quarter of this year was 18,000 tonnes and in the second quarter, 19,500 tonnes. Comparable figures for Potrerillos and El Teniente are: 3,100 and 3,450 tonnes and 12,350 and 14,000 tonnes.

There is a proposal for a merger between Copper Cliff Consolidated Mining Corporation, New Royan Copper Mines, Ltd., and Copper Rand Chibougamau Mines Ltd., which all have copper interests in the north-west area of Quebec. The merger would give Copper Rand a total area of 18 square miles.

LEAD.—Lead has been a strong market in the United States in the past week at 16 c. per lb. The keenness in domestic demand which had been growing even before the outbreak of the Suez crisis has been well maintained, especially as the seasonal peak for battery manufacture is now almost at hand. But the market has been further strengthened by the rise in lead on the London market. Suez has, therefore, had a noticeable if fairly indirect effect. In the circumstances the fact that a fair amount of business is being done in New York on a flat price basis is not surprising. Unofficial figures suggest that sales of lead for August delivery were 8,000 tons up on the total for July and the total for September is assured of an even greater rise. Meanwhile output of recoverable lead from American mines reached 28,108 tons against 29,263 in June; the fall was largely due to the incidence of the holidays. Whether the American price is ready for another increase is difficult to say. But if the European price level remains firm and Mexican and other metal crosses the Atlantic the prospect seems good.

TIN.—Not unnaturally tin has reacted more than the other metals to the Suez crisis and last week the market continued generally strong although there has been some retreat from the highest levels. Spot Straits metal touched 108 c. per lb. on September 14, but it has since declined to 105.75 c. It was always known that the I.T.A. buffer stock manager would have money but not metal when the contributions to the stock became due; and it was also realized that tin would probably be in the middle range when the manager would remain inactive and unable to acquire metal. The Suez crisis has made the position even more quixotic. On September 15, when initial contributions to the pool became due, the London price of the metal was comfortably above £800 (though it has since dropped below), at which figure the manager could at his discretion sell. This situation means that there is no inconvenience in the fact that Malaya is to exercise her right not to pay her contribution for some time yet. She will not have defaulted if her contribution is made over by December 15.

There is no doubt that the recent rise reflects simply the fear that supplies from the East will be interrupted by the Suez crisis and that a solution of the crisis would see a fall to more reasonable levels. But the fall would certainly not be precipitate. Consumption is outstripping the visible supplies and while the Texas smelter continues to operate there is no possibility of a glut of tin. Even if Suez is solved, therefore, the outlook remains good for tin.

The European Tin Miners Federation has expressed confidence in the tin industry of Malaya and has denied that British capital will leave Malaya when independence is achieved.

The final report of the Malayan War Damage Commission has shown that of 250,000 payments totalling $M441,700,000 the tin industry had received $M82,700,000.

World mine output in July again reached 14,600 tons as in June.

The Daily Times of Lagos reports fresh labour unrest in the Nigerian mines and that the Secretary of the African Workers' Union has accused employers of disregarding decisions taken by the Chairman at the recent Joint Industrial Council meeting. The government labour officer at Jos has said there is no threat of strike action and the employers have declined to comment.

ZINC.—Zinc in the United States has had another good week with the better buying tendency helped along by encouraging figures for August. Figures for May, June and July had all been bad because of the cutback in automobiles and latterly because of the steel strike. August deliveries were 70,709 tons against only 34,219 tons in July, but they were still down compared with the first quarter's average. The stockpile took 16,075 tons, 1,500 more than in July. However, zinc smelter output increased further by 6,500 tons to 89,569 tons. As a result, in spite of the better deliveries, stocks continued to rise to 104,325 tons at the end of August. Mine output in July produced 42,900 tons and reflected the holiday season by a fall of 5 per cent. Meanwhile, commercial demand for Prime Western grade at 13.50 c. per lb. East St. Louis is encouraging with galvanizers wanting useful tonnages, but the long looked for revival in special high grade has not yet appeared.

MANGANESE.—U.S. steel producers are reported to be seriously concerned at the inflationary consequences which are anticipated from the new export duty imposed by the Indian Government on manganese ore (*The Mining Journal*, 7/9/56, p. 280). The new duty is expected to amount to about 15 c. per unit of manganese on high grade material, or nearly three times the U.S. import duty. It has been forecast that high grade Indian ore at Atlantic ports will rise to about $1.55 per unit and possibly even higher, since ocean freight rates are also trending upward. In other words, the price of Indian manganese ore in the U.S. may have doubled within a year. It takes about 14 lb. of manganese to make a pound of steel and, of course, considerably more to produce the special alloy steels containing manganese. The effects of the Indian Government's export tariff on steel prices throughout the free world and hence on almost all segments of the economy, are thus likely to be very marked.

During the first five months of 1956, India was shipping manganese ore to the U.S. at the rate of 650,000 s.tons annually, equivalent to about one-third of the total U.S. imports during that period. Higher prices for Indian ore will stimulate the exploitation of the lower grade North American ores, a development which already has serious implications for suppliers overseas. They will also encourage buyers in the U.S. and elsewhere to obtain more manganese from Africa, Latin America, and any other potential sources. Finally, it should not be forgotten that competition between metals themselves tends to become increasingly severe. Manganese is now replacing part of the nickel content in certain stainless steels. It might well be that higher manganese prices would lead to the development of alternative materials capable of reducing the consumption of this metal in the steel industry. These are considerations which it is to be hoped, may yet cause the Indian Government to have second thoughts before jeopardising the prosperity of its manganese industry, which is only now recovering from the recent slump.

MICA.—India is responsible for a high proportion of the world output of mica and about 80 per cent of its production comes from Bihar. In 1955 the Indian production of dressed mica was nearly 27 per cent higher than that of the previous year, though still 32 per cent below the 1951 level. Exports last year amounted to 241 tons valued at Rs.79,996,552. During the year Bihar exported block mica splittings and mixed types of mica worth Rs.63,754,997.

In its annual report the Indian Mica Miners' and Dealers' Association expressed grave concern over the progressive fall in the prices of mica since 1952. The average price of block mica, which was Rs.1,158 per cwt. in 1952, came down to Rs.841 in 1955. Similarly, mica splittings which fetched Rs.468 per cwt. in 1952 fell to Rs.200 in 1955. This year, however, Indian mica is fetching high prices in overseas markets and export earnings have been well maintained, despite a sharp decline in the volume of shipments. During April and May, shipments of Indian mica fell to 73,841 cwt. compared with 102,040 cwt. in the corresponding months of last year, but earnings amounted to Rs.14,700,000, showing only a fall of Rs.500,000. The prices realized by Indian mica for export have appreciated to Rs.214 per cwt. in May this year, compared to Rs.142 per cwt. in the corresponding months of last year. The enhanced prices are attributed to the keen interest evinced by European buyers of Indian mica. Demand is being well maintained.

URANIUM.—Signing of a multi-million dollar contract for the sale of Canadian uranium to Britain is likely to be announced in the near future. Final details of the contract are now being discussed by Mr. William Strath and Mr. James A. Nichol, of the British Atomic Energy Authority, and Mr. William J. Bennett, president of Canada's Crown-owned Eldorado Mining and Refining Ltd.

Uranium has become a very profitable business for Canada. In 1955, El Dorado earned a net profit of $3,632,586. The company's capital expenditures for 1956 are estimated at $15,000,000. The bulk of this will be spent on expanding the Beaverlodge mill to 2,000 tons capacity. The budget also provides for a pilot plant to be built at Port Hope for testing a process for producing uranium metal. In Ottawa a new laboratory is to be built for the research and development division at an estimated cost of $425,000. Research results will be made available to all Canadian producers.

Yet another major development in this Dominion's snowballing uranium industry is foreshadowed by the announcement that Northspan Uranium Mines, Ltd. plans to raise $70,000,000 through the private placing of general mortgage bonds and an assured bank loan. The company operates as an affiliate of Rio Tinto Mining Co., of Canada, Ltd., which manages companies holding more than $500,000,000 in uranium purchase contracts granted by the Canadian Government. The new plans are to be applied to the completion of uranium mines and mills in the Blind River area of Ontario, where Northspan will erect three mills, each scheduled to start production within a year. The mills will have an aggregate capacity of 9,000 tons of uranium ore a day. The company holds a letter of intent from the Crown-owned Eldorado Mining and Refining Ltd., for the purchase of uranium oxide to a value of more than $240,000,000.

The Stancan Uranium Company has announced the receipt of a letter of intent from Eldorado for the purchase of uranium concentrates worth $76,300,000 (£27,200,000). To handle this contract it is forming a new company. Stanrock Uranium Mines, which will sink two shafts and erect a mill with a capacity of 3,300 tons of ore per day. Production is due to begin on October 1, 1957.

South Alligator Uranium, No Liability, a company with a capital of £2,000,000 formed to work an area of uranium development and prospecting in the Northern Territories, has recently started operations.

The London Metal Market

(From Our Metal Exchange Correspondent)

There seems to have been some improvement in the labour situation in the Northern Rhodesian Copper Belt following the recent disturbances and the further arrests which were made under the Emergency Regulations. The appeal of the President of the Northern Rhodesian African Mineworkers' Union seems to have had a good response and there has been a more or less general return to work. Consumers in Europe and the United States have shown no anxiety to rush in to buy, and in rather dull conditions the market has tended easier. At the same time the uncertainty surrounding the outcome of the Suez problem overhangs markets generally.

With the possibility of delays in shipments of tin from the East owing to the Suez situation, and in view of the apparently nearly balanced state of supply and demand at any rate for this year, there was a rush of over-anxious buyers and prices advanced about £55 per ton last week. The market has since eased back and this steep advance has been lost. The International Tin Agreement is now theoretically in operation, but as producers are only just starting to make their contributions, mainly in cash, the Buffer Stock has no tin to sell to check the market price when it gets into the £800-£880 range. On Thursday morning the Eastern price was equivalent to £815½ per ton c.i.f. Europe.

Lead and zinc prices have also declined with copper and tin, and consumer demand both here and on the Continent have been quiet. In America consumers have maintained a fairly active interest in both metals at steady prices.

Closing prices and turnovers are given in the following table:—

	September 13		September 20	
	Buyers	*Sellers*	*Buyers*	*Sellers*
Copper				
Cash	£309	£309½	£296½	£297½
Three months	£308½	£309	£295½	£296
Settlement	£309½		£297½	
Week's turnover	4,175 tons		4,700 tons	
Tin				
Cash	£807	£808	£794	£795
Three months	£799	£800	£784	£785
Settlement	£808		£795	
Week's turnover	1,260 tons		895 tons	
Lead				
Current half month	£118½	£119	£116½	£117
Three months	£116½	£116½	£114½	£115
Week's turnover	2,850 tons		2,150 tons	
Zinc				
Current half month	£97	£97½	£96	£96½
Three months	£94½	£95	£94½	£94½
Week's turnover	3,675 tons		3,300 tons	

OTHER LONDON PRICES — SEPTEMBER 20

METALS

Aluminium, 99.5%, £198 10s. per ton
Antimony —
English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60%) bases 23s. 6d./24s. 6d. nom. per unit, c.i.f.
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 12s. 0d. lb.
Chromium, 6s. 11d. lb.
Cobalt, 21s. lb.
Gold, 251s. 7½d
Iridium, £29/31 oz.
Manganese Metal (96%-98%) £259/£265 according to quantity
Magnesium, 2s. 4d. lb.
Nickel, 99.5% (home trade) £519 per ton
Osmium, £24/27 oz. nom.
Osmiridium, nom.
Palladium, £8 0s./£8 10s. oz.
Platinum U.K. and Empire Refined £34/£35 oz. Imported £37 15s. nom.
Rhodium, £42.
Ruthenium, £15/£17 oz.
Quicksilver, £83 10s. ex-warehouse
Selenium, 112s. nom. per lb.
Silver, 78¾d. f.oz. spot and 78¾f'd.
Tellurium, 15s./16s. lb.

ORES, ALLOYS, ETC.

Bismuth	60% 8s. 3d. c.i.f. 30% 5s. 0d. lb. c.i.f.
Chrome Ore —	
Rhodesian Metallurgical (semifriable) 48%	£16 15s. 0d. per ton c.i.f.
„ Hard Lumpy (45%)	£16 15s. 0d.
„ Refractory 40%	£10 15s. 0d. per ton c.i.f.
„ Smalls 42%	£13 15s. 0d. per ton c.i.f.
Baluchistan	£17 5s. 0d. c.i.f.
Magnesite, ground calcined	£28 0s./£30 0s. d/d
Magnesite, Raw (ground)	£21 0s./£22 0s. d/d
Molybdenite (85% basis)	8s. 2½d. nom. per lb. (f.o.b.)
Wolfram and Scheelite (65%)	239s. 0d./243s. 0d. c.i.f.
Tungsten Metal Powder (98% Min. W.)	19s. 10d. nom. per lb. (home)
Ferro-tungsten (80%-85%)	16s. 10d. nom. per lb. (home)
Carbide, 4-cwt. lots	£41 3s. 9d. d/d per ton
Ferro-manganese, home	£68 per ton
Manganese Ore Indian Europe (46%-48%) basis 125s. freight	107d. nom. per unit c.i.f.
Manganese Ore (43%-45%)	100d./101d. nom. per unit c.i.f.
Manganese Ore (38%-40%)	94d. nom. per unit.
Brass Wire	3s. 0½d. per lb. basis
Brass Tubes, solid drawn	2s. 4½d. per lb. basis

COMPANY NEWS AND VIEWS

London Holds Firm Against Wall Street Fall

During the past week the *Dow Jones Industrial Ordinary Index* came back sharply to 488.72 on September 19 from 499.69 on September 13. London, however, took little notice of this decline and the *Financial Times Ordinary Index* lost less than one point to 181.3. Mining issues again gave a good account of themselves. Outstanding features were useful gains in Eastern tins and a renewed interest in gold issues, particularly those of the O.F.S. Business in the latter section, however, was very restricted.

Factors mainly responsible for Wall Street's troubles continued to be domestic and international political apprehensions, together with fears regarding harder money policies.

Amongst golds, Anglo O.F.S. companies virtually recovered dividend payments made earlier in the week. Winkelhaak improved on rumours of good values. Other features were rises in West Drie and Harties.

Messina stood out from a dull copper market with a gain to 184s. from 173s. Rho Khats hardened. Some Australian lead zincs moved up further.

Investment Attractions of Bancroft

Perhaps part of the recent interest attracted by Bancroft Mines' shares has been due to belated recognition of favourable taxation provisions applicable to the new copper mines in Rhodesia. That the new South African gold mines (apart from West Driefontein) are not liable to taxation or lease payments until aggregate profits exceed aggregate capital expenditure, is widely appreciated to-day, but the similar provisions in the Income Tax Act of the Central African Federation have received virtually no publicity. This Act defines a new mine as one which first commenced regular production after March 31, 1953, and there is also a provision for a mine such as Kansanshi which had been closed down but was subsequently resuscitated and commenced regular production after March 31, 1953, to benefit from these provisions. In the case of such mines, Section 20 of the Act provides for capital expenditure redemption allowance.

Favourable Tax Position

In brief, Bancroft is allowed to write off all pre-production capital expenditure (with minor exceptions) and the first five years' post-production capital expenditure within five years of the start of operations. Any subsequent capital expenditure may be written off in the year in which it is incurred. As a result, the repayment of loans and the financing of a part of capital expenditure from profits is greatly facilitated and despite heavy appropriations for these purposes, there is also the prospect of earlier dividend payments.

It is officially estimated that it will cost £19,750,000 to bring Bancroft to production at 85,600 l.tons of copper per annum. These funds have been, or are to be, raised as follows :—

20,000,000 5s. stock issued at 6s. a unit ...	£6,000,000
2,000,000 5s. stock under option at 37s. 6d. until June 30, 1958	£3,750,000
5 per cent loan by Rhokana repayable in four equal annual instalments starting December 31, 1958	£3,000,000
3½ per cent loan repayable in cash on December 31, 1960, or at the option of Bancroft, convertible into Notes having a life of from 15 to 20 years with interest at 6 per cent per annum	£5,000,000
Additional funds which will probably be appropriated from profits	£2,000,000
	£19,750,000

Of profits earned in the first five years of operations, some £20,000,000 will thus be free of taxation.

LONDON STOCK EXCHANGE PRICES — SEPTEMBER 13 - SEPTEMBER 19, 1956

Finance	Price Sept.19	+ or — on week
African & European	3/-	.....
Anglo American Corpn.	7½	—⅛
Anglo-French	23/3	+3d
Anglo-Transvaal Consol.	1½	+⅛
Central Mining (£1 shrs.)	54/6	—6d
Consolidated G'fields	61/-	—9d
Consol. Mines Selection	1½	.....
East Rand Consols	1/7½	—1½d
General Mining	3⅛	+⅛
H.E. Prop.	8/6	—1½d
Johnnies	40/3	+1/9
Rand Mines	3½	+⅛
Rand Selection	1⅛	.....
Union Corporation	38/6	+2/6
Vereeniging Estates	5	+⅛
Writs	1⅜	+⅛
West Wits.	36/3	+4½d
Rand Gold		
Blyvoors	22/-	—1½d
Brakpan	6/3	.....
Buffelsfontein	28/10½	+1/6
City Deep	10/6	—3d
Consol. Main Reef	14/4½	+7½d
Crown	1⅛	.....
Daggas	36/7½	—3/4½
Dominion Reefs	18/6	+3d
Doornfontein	21/4½	+7½d
Durban Deep	1½	.....
E. Champs	3/-	.....
E. Daggas	9/4½	.....
E. Geduld (4s. units)	28/3	.....
E. Rand Props.	45/-	—1/3
Geduld	3½	.....
Govt. Areas	3/9	—1½d
Grootvlei	19/4½	.....
Hartebeestfontein	41/1½	+1/3
Libanon	7/3	+1½d
Luipards Vlei	12/10½	—1½d
Marievale	20/7½	—3d
New Kleinfontein	3/10½	.....
New Pioneer	15/-	+9d
Randfontein	37/9	+9d
Robinson Deep	8/9	.....
Rose Deep	9/6	.....
Simmer & Jack	3/10½	.....
S.A. Lands	1⅛	.....
Springs	2/6	.....
Stilfontein	24/10½	+9d
Sub Nigel	1⅛	.....
Vaal Reefs	31/-	+10½d
Van Dyk	2/3	—3d
Venterspost	13/7½	—3d
Vlakfontein	16/7½	.....
Vogelstruisbult	14/10½	—6d
West Driefontein	5⅛	+⅛

Rand Gold contd.	Price Sept.19	+ or — on week
W. Rand Consolidated	1⅛	—⅛
Western Reefs	27/7½	—1½d
O.F.S. Gold		
Freddies	8/9	+9d
Free States Consolidated	4/3	+3d
F.S. Geduld	4⅛	+⅛
Geoffries	8/3	+10½d
Harmony	26/7½	+4½d
Loraine	5/9	.....
Lydenburg Estates	15/7½	+7½d
Merriespruit	7/3	—1½d
Middle Wits	11/6	+3d
Ofsits	58/6	+1/9
President Brand	2⅛	—⅛
President Steyn	33/-xd	+1½d
St. Helena	28/6xd	+9d
Virginia Ord.	9/7½	.....
Welkom	18/6	+1½d
Western Holdings	3½	—⅛
West African Gold		
Amalgamated Banket	1/4½	.....
Ariston	3/9	—1½d
Ashanti	15/-	.....
Bibiani	2/-	.....
Bremang	1/3	—1½d
G.C. Main Reef	1/6	.....
Kononga	1/6	.....
Marlu	1½d	.....
Taquah	1/10½	—3d
Western Selection	7/10½	+1½d
Australian Gold		
Gold Mines of Kalgoorlie	13/10½	.....
Great Boulder Prop.	11/4½	+1½d
Lake View & Star	16/1½	—1½d
Mount Morgan	19/3	.....
North Kalgurli	7/3	.....
Sons of Gwalia	2/6	—1½d
Western Mining	11/1½	+1½d
Miscellaneous Gold		
Cam & Motor	7/6	.....
Champion Reef	6/3	—1½d
Falcon Mines	7/9xd	—1½d
Globe & Phoenix	22/6	—1/3
Motapa	10½d	.....
Mysore	3/3	—1½d
Nundydroog	9/-	—4½d
St. John d'El Rey	32/6	+1/-
Zams	2⅛	+⅛

Diamonds and Platinum	Price Sept.19	+ or — on week
Anglo American Inv.	9½	+⅛
Casts	25/-	+3d
Cons. Diam. of S.W.A.	10/6	—3d
De Beers Defd. Regd.	5⅛	—⅛
De Beers Pfd. Regd.	13½	—¼
Pots Platinum	13/10½	—1½d
Waterval	23/3	+3d
Copper		
Bancroft	50/-	+1/6
Chartered	75/6	+3/6
Esperanza	3/-	.....
Messina	9⅛	+⅛
Nchanga	13½	—⅛
Rhod. Anglo-American	5⅛	—⅛
Rhod. Katanga	43/3	+2/6
Rhodesian Selection	49/6	—9d
Rhokana	43	¼
Rio Tinto	4½	+⅛
Roan Antelope	27/4½	—3d
Selection Trust	4½	.....
Tanks	7⅛	.....
Tharsis Sulphur Br.	4½	+⅛
Tin (Eastern)		
Ayer Hitam	20/6xd	+3d
Gopeng	10/9	+9d
Hongkong	5/4½	.....
Ipoh	25/3	—3d
Kamunting	9/6	—6d
Kepong Dredging	3/3	.....
Kinta Tin Mines	16/-xd	+6d
Malayan Dredging	11/9xd	+1/-
Pahang	13/-	+10½d
Pengkalen	14/9	.....
Petaling	7/3	—1½d
Rambutan	22/6	+6d
Siamese Tin	11/3	+7½d
Southern Kinta	16/6	+9d
S. Malayan	7/9xd	+4½d
S. Tronoh	6/7½	+6d
Sungei Kinta	16/-	+1/-
Tekka Taiping	7/10½	.....
Tronoh	9/4½xd	—1½d
Tin (Nigerian and Miscellaneous)		
Amalgamated Tin	10/3xd	—3d
Beralt Tin	52/-	+2/-
Bisichi	4/4½	+3d
British Tin Inv.	23/9	+3/1½
Ex-Lands Nigeria	2/-	.....
Geevor Tin	17/4½	+9d

Tin (Nigerian and Miscellaneous) contd.	Price Sept.19	+ or — on week
Gold & Base Metal	1/1½	.....
Jantar Nigeria	4/7½	+1½d
Jos Tin Area	12/4½	+1½d
Kaduna Prospectors	1/6	.....
Kaduna Syndicate	2/-	.....
London Tin	9/10½	+9d
United Tin	1/-	.....
Silver, Lead, Zinc		
Broken Hill South	6½/6	—6d
Burma Mines	4/1½	—1½d
Consol. Zinc	68/3	+2/-
Lake George	14/4½	.....
Mount Isa	27/-	+1/9
New Broken Hill	50/-	+1/6
North Broken Hill	101/6	—4/-
Rhodesian Broken Hill	11/-	—3d
San Francisco Mines	27/-	+3d
Uruwira	4/3	.....
Miscellaneous Base Metals and Coal		
Amal. Collieries of S.A.	52/6	+1/3
Associated Manganese	40/6	+1/6
Cape Asbestos	9/9	.....
C.P. Manganese	23/-	—7½d
Consol. Murchison	53/9	+1/3
Natal Navigation	3½	.....
Turner & Newall	102/6	—2/1½
Wankie	16/6	—6d
Witbank Colliery	5	.....
Canadian Mines		
Dome	$27	.....
Hollinger	$51½	—½
Hudson Bay Mining	$167	—1½
International Nickel	$202	—1½
Mining Corpn. of Canada	£9½	.....
Noranda	$121½	—2
Quemont	£9¼	—¼
Yukon	4/10½xd	—3d
Oil		
Apex	46/3	+2/6
Attock	34/9	—1/-
British Petroleum	7⅛	—⅛
Burmah	88/9	+1/3
Canadian Eagle	68/6	+2/9
Mexican Eagle	22/7½	+1½d
Shell	7½	—¼
T.P.D.	47/-	—6d
Ultramar	46/6	+3/9

The mine is due to start production at the beginning of 1957 with an output capacity of 42,800 l.tons of copper per annum and this capacity is to be extended to 85,600 l.tons per annum by the beginning of 1960. The company's prospectus dated August 19, 1953, estimated that with copper at £200 per l.ton, the cost of production and delivery to European markets would be approximately £100 per l.ton. Since then inflation has led to an increase in expenses and it would perhaps be as well to allow for costs of £110 per l.ton at a copper price of £200. This would mean a working profit of £90 per ton or £3,600,000 per annum on sales of 40,000 l.tons. If we assume sales at this rate from July 1, 1957, to June 30, 1960, the first three years' production should show an aggregate profit of £10,800,000. Assuming sales at 80,000 l.tons of copper per annum from July 1, 1960, the annual rate of profit would be £7,200,000 and two years' production at this level would bring the aggregate profits for the first five years of production to just over £25,000,000. Bearing in mind that approximately £20,000,000 would be free of taxation, it is apparent that the company could comfortably repay the loans totalling £8,000,000 and appropriate the additional £2,000,000 from profits and at the same time pay quite reasonable dividends. This with copper at £200 per ton. When full taxation is payable, the profit of £7,200,000 per annum from sales of 80,000 tons would be reduced by £2,700,000 to a net figure of £4,500,000 equivalent to net earnings of rather more than 4s. per share on 22,000,000 shares. With copper at £250 per ton, and allowing for the increase in costs as a result of higher royalty and employees' bonuses, the net profit after full taxation on a sales output of 80,000 tons per annum would be over £7,000,000, equivalent to net earnings of about 6s. 6d. per unit. Bancroft 5s. stock is at present quoted at around 50s.

Cobalt Should Not Be Overlooked

Some interesting cobalt results have been obtained in drilling, and whilst these have not been good enough to suggest the certainty of cobalt production, it must rank as a possibility. Bearing in mind that £240 per ton is considered as a likely "floor" for the copper price in the absence of a very marked recession in the United States, Bancrofts obviously have interesting possibilities. This exercise does at least show that recent buying of Bancrofts may be soundly based despite uncertainties concerning the copper price at the present time. Buying in anticipation of the issue of American Depository Receipts for the shares was, however, no doubt one of the main reasons for recent activity.

Rio Tinto Forms Three New Subsidiaries

In pursuance of its policy of decentralization, The Rio Tinto Company has formed three new subsidiaries in Rhodesia. These are called the Rio Tinto Mining Company of Central Africa; Rio Tinto (Northern Rhodesia) and Rio Tinto (Southern Rhodesia). The two last named companies have purchased from Rio Tinto Finance and Exploration, London, that company's exploration programmes in Northern and Southern Rhodesia.

It is stated that The Rio Tinto Mining Company of Central Africa will be a wholly-owned subsidiary of Rio Tinto, London. It will hold substantial interests in both the Northern and Southern Rhodesian companies. Other members within the Rio Tinto Group will also hold interests in these companies.

Amalgamated Tin Earns Less But Pays Same

Profits for the year ended March 31, 1956, made by Amalgamated Tin Mines of Nigeria declined to £1,235,366 from £1,484,069 previously. This figure included a dividend of 200 per cent from Keffi Tin Company which brought in a gross amount of £154,122 (1955, £77,061). After taxation of £695,500 against £768,000, and appropriations of £29,000 £214,000), profits available for distribution advanced to £510,866 from £502,069. Dividends of 45 per cent (same) on the issued capital of £1,950,000 (same) absorbed £504,562 (£494,812). Unappropriated profits of £280,763 compared with £274,459.

The aggregate profit of the company's two subsidiaries, Keffi Tin and London Nigerian Mines fell sharply to £47,859 from £276,451. This figure was struck after providing for taxation of £83,393 (£299,269) together with dividends paid to Amalgamated Tin.

Camp Bird Bids for Tekka-Taiping

At the recent extraordinary meeting of Tekka-Taiping convened by requisitionists, including Col. Scammel and his supporters, it was disclosed by the chairman that an offer to acquire the company's capital has been received from Camp Bird. The terms of the bid were one Camp Bird 10s. share for every two Tekka-Taiping 15s. shares plus 1s. per Tekka-Taiping share cash payment. It was accordingly resolved to adjourn the meeting for 28 days in order to circulate the offer to shareholders.

Since the above events took place it has been reported that Col. Scammel and his committee have decided to recommend acceptance of the Camp Bird offer.

Company Shorts

Harmony Pays 6d. Maiden.—A maiden dividend of 6d. per share has been declared by Harmony Gold Mining Company. This distribution is payable to shareholders registered at the close of business on September 29. Warrants will be posted on or about November 8. Transfer books and Register of Members will be closed from October 1 to 7 inclusive.

Water Inrush at Merriespruit.—A fall of hanging wall was responsible for an inrush of water in a development end on 31 level at Merriespruit (Orange Free State) Gold Mining last week. Measures have been taken to control the flow but normal operations will be interrupted for about a week.

St. Helena Pays Final of 7d.—A final dividend of 7d. a share has been declared by St. Helena Gold Mines in respect of the year ending December 31, 1956. Together with the maiden interim of 6d., total distribution for the year has thus reached 1s. 1d.

Chartered Pays 10 Per Cent Interim.—The British South African Company has declared an interim dividend of 10 per cent in respect of the year ending September 30, 1956. In 1954-55 the interim was only 6¼ per cent and the increase, it is stated, is solely to bring interim and final rates into better proportion.

POWELL DUFFRYN LIMITED

The Annual General Meeting of Powell Duffryn Limited was held on September 19 in London, **Sir Henry Wilson Smith, K.C.B., K.B.E.** (deputy chairman), presiding.

The following is an extract from the circulated statement of the chairman, Sir Herbert Merrett :—

At last our claims for compensation for our nationalized assets have been settled. We received a net figure of £2,557,868 for our Power Stations, the final item in dispute. This brings the total compensation of the Group under the Coal Industry Nationalization Act to £15,964,712.

The sale of the Compensation Stock strengthens the cash position of the Company, but there is no intention to make any further capital distribution to shareholders. We have capital commitments exceeding £3 million, and there are a number of proposals for further development which will require still more capital expenditure.

The profits of the year again shew an improvement upon previous years, before taking into account items of income of a non-recurring nature. It is unlikely that such items will appear in future accounts.

GROUP ACTIVITIES

There was a further substantial increase in the activities of **Stephenson Clarke Ltd.** and of its Associated Companies. Stephenson Clarke itself not only continued its traditional role as one of the leading coal distributors in this country, but also played a major part in the large-scale coal import programme. The Company's fleet of ships remains fully employed and, various steps are being taken to diversify its range of activity.

Maris Export and Trading Company Limited had an exceptionally good year due to the continuance in 1955 of still sizeable exports of British Coal combined with greatly increased activity on sales of American coal to this country and to the Continent. Immediate prospects are inevitably more favourable under the second head than under the first.

Associated Coal and Wharf Companies Ltd. by its published results has shewn the valuable nature of this particular investment. In addition to the healthy state of its normal coal business, the Company is making satisfactory progress in the development of fuel oil distribution.

Weatherfoil Heating Systems Ltd. has well maintained its progress. To its normal business it has added the sales agency for Dravo Oil Fired Space Heaters, an appointment which has made an encouraging start.

In Northern Ireland, the business of John Kelly Limited, in which we are equal partners with William Cory and Son Limited, continues to be well run and active.

Cory Brothers and Co. Ltd. continues to shew good results and increased turnover, especially in oil storage, distribution, and bunkering. Additions are being made to the storage and bunkering facilities at Barry, Ipswich and at Las Palmas.

Long term contracts have been made with major Oil Companies which justify the expectation of reasonable profits at all these depots in the coming years.

Our business in the Timber industry has expanded both at home and abroad. A new Insulation Board Mill is now in course of erection in Wales and should be in operation in 1957.

We expect that its output will find a ready market as the products which the mill is to manufacture are now being imported in substantial quantities.

Cambrian Wagon and Engineering Company Ltd. has maintained its output and its profits on a steady basis. The manufacture of liquid storage containers has been increased and further expansion is planned for the near future.

Rhymney Engineering Company, in which we are associated with International Combustion (Holdings) Ltd., was fully and profitably employed during the year.

Powell Duffryn Technical Services Ltd. have had a successful year. Their area of employment is widening and their services are in great demand.

Powell Duffryn Carbon Products Ltd. continues to produce heat-exchangers, etc., and have under active consideration a number of interesting and soundly-based developments of their business.

My agreement for service with your Company expires in a few months and at the end of that time I do not intend to seek re-election either as Chairman or as a Director of the Company. It is the intention of your Board to appoint Sir Henry Wilson Smith, K.C.B., K.B.E., to the Chairmanship of the Parent Company and its principal operating subsidiaries, and with the knowledge I have obtained of the strength and sound judgment of Sir Henry, I shall pass over my duties to him with the greatest possible confidence.

The Report and Accounts were adopted.

Metal and Mineral Trades

Cable Belt Conveyor at Bestwood Colliery. Length 7,500 ft. Lift 220 ft. 42 in. belt at 350 ft. per minute.
Photograph by permission of No. 6 Area, East Midlands Division of the National Coal Board.

Distance no object with a

CABLE BELT CONVEYOR

Cable Belt Conveyors are either installed, or are to be installed, in the following collieries of the National Coal Board:—

SCOTTISH DIVISION

East Fife Area :
Michael Colliery.
West Fife Area :
Comrie Colliery.
Central East Area :
Kingshill No. 1.
Polkemmet.
Central West Area :
Argyll Mine.
East Ayr Area :
Knockshinnoch Castle.

NORTH EASTERN DIVISION

No. 8 Area :
Ackton Hall.
No. 3 Area :
Kilnhurst.
Elsecar Main.
No. 5 Area :
Dodworth.
No. 7 Area :
Thornhill.

NORTHERN N. & C. DIVISION

No. 1 Area :
Havannah Mine.

EAST MIDLANDS DIVISION

No. 3 Area :
Rufford, Bilsthorpe.
Shirebrook, Mansfield.
No. 6 Area :
Clifton, Bestwood,
Babbington, Linby.
No. 5 Area :
Moorgreen.

DURHAM DIVISION

No. 1 Area :
Washington Glebe.

CABLE BELT LIMITED

ROSE STREET, INVERNESS

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